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ENTOMOLOGY.—*A new species of flea of the genus Opisodasys from Mexico.*<sup>1</sup>

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Among the Siphonaptera I collected when serving as parasitologist with the Fourth Hoogstraal Expedition to Mexico in 1941 is a series representing an undescribed species of *Opisodasys* Jordan, 1933. It is my opinion that the structure of the aedeagus is of taxonomic importance, and hence details visible in mounted or remounted specimens are included in the description that follows. The terms used in this section, as well as most of the others, are based upon the excellent morphological studies of Snodgrass (1946).

*Opisodasys hollandi*, n. sp.

This species is separated from all other North American *Opisodasys* by the facts that the male eighth sternum is without bristles and has a bifid apex and that the male eighth tergum bears a prominent conical lobelike sclerotization along the caudal border.

Nearest *Opisodasys perotensis* Dampf, 1942, in general structure of male claspers and ninth sternum, and in chaetotaxy and spiculose portion of eighth tergum. Distinct in that the movable finger is broader, its caudal margin more biconvex, and in possessing an apical small mesial spiniform, a long subapical marginal bristle, and two stout submarginal mesial spiniforms on proximal half, instead of three marginal mesial spiniforms (none apical) as in *O. perotensis*. Ninth sternum with several rows of spiniforms, not just with a marginal row. Female resembles *O. perotensis* in shape of spermatheca and in outline of VII sternum, but in *O. hollandi* the upper lobe of the caudal margin of the VII sternum is acute, not rounded.

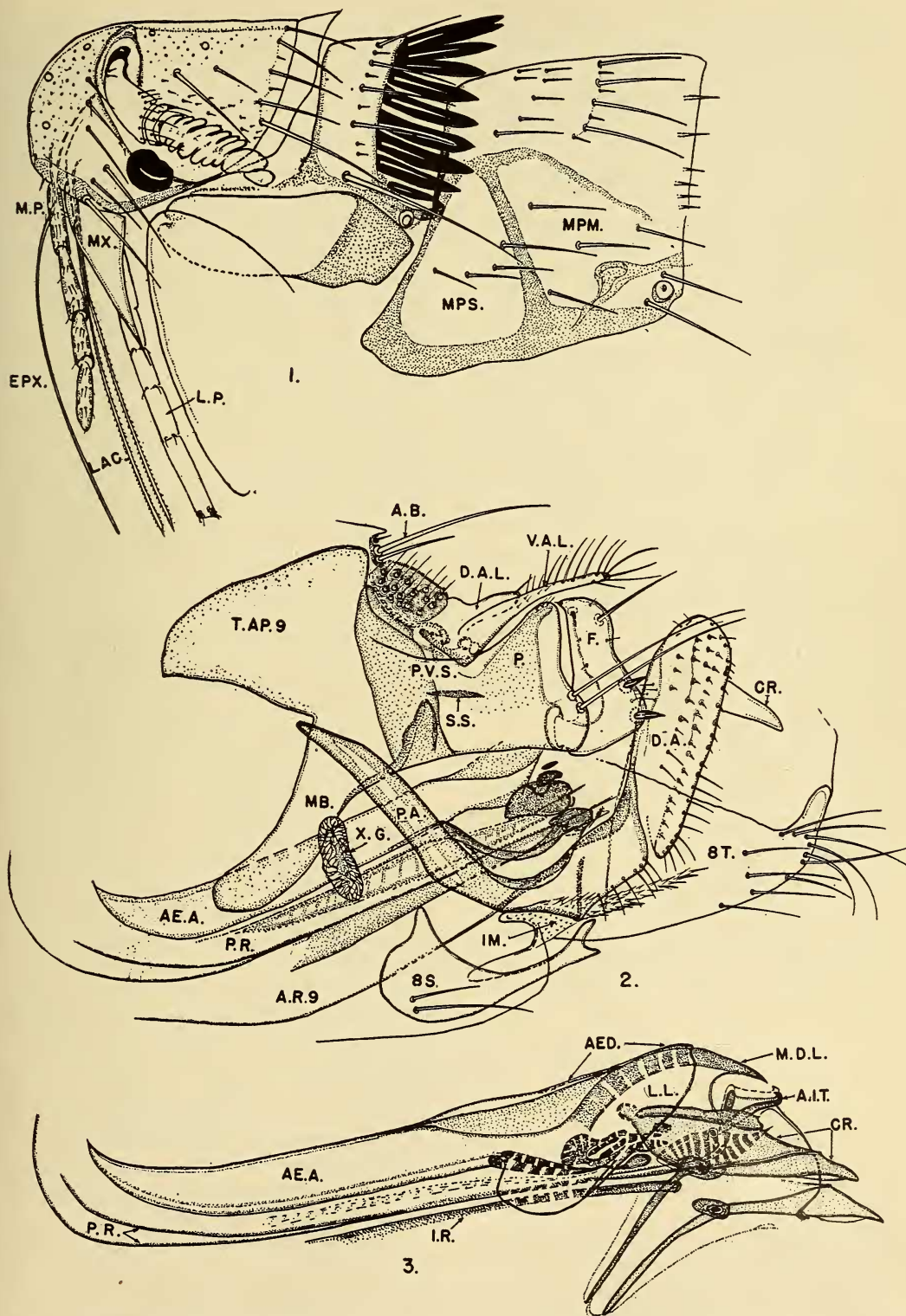
The conical sclerotization along the caudal border of the male eighth tergum suggesting the sclerotized spur on the ventrocaudal angle

of that of *O. pseudarctomys* (Baker, 1904).

This is a very large species, the males averaging 4 mm in length, the females 4.5 mm.

*Male and female.*—HEAD (Fig. 1): Clypeus (frons of authors) evenly rounded, with frontal tubercle median but slight, indistinct, arising from a small marginal sclerotization. Sparsely granular cephalad and dorsad of row of bristles. Preantennal region with one row of six bristles, with the most dorsal bristle the smallest and bordering the antennal groove; the ventralmost bristle and the preocular bristles the longest. Two or three tiny hairs bordering antennal groove cephalad of the subovate, well-developed eye. A very small bristlelike projection at ventral angle of clypeus, between the small labrum and the well-developed 4-segmented maxillary palpus (M.P.). Epipharyngeal stylet (EPX.) arising between maxillary palpi; very feebly serrate or denticulate apically. Maxillary lobe (MX.) an acute triangle, extending slightly beyond apex of third maxillary palpal segment. Maxillary laciniae (LAC.) (mandibles of authors) about one-third diameter of labial palpus; with apical two-thirds denticulate or microserate, the serrations directed ventrad. Lacinal and epipharyngeal stylets subequal and, like the 5-segmented labial palpi (L.P.), extending slightly beyond apex of forecoxae. Scape of antenna long, subequal in length to subovate 9-segmented clavus, with two or three very small marginal hairs near insertion, and an apical row of very small bristles. Pedicel of antenna with somewhat longer bristles, but those in male extending less than one-fourth length of clavus, in female less than one-third. With a series of very small bristles in two irregular rows along dorsal margin of antennal groove. Postantennal region stippled near cephalic and dorsal margins; with a median row of two bristles and a submarginal row of five long bristles. Female with an addi-

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FIGS. 1-3.—*Opisodasys hollandi*, n. sp.: 1, Head, male; 2, modified abdominal segments, male; 3, aedeagus. (See p. 139 for list of abbreviations.)



tional bristle ventrad to the ultimate very long bristle extending caudad to pronotal ctenidium.

**THORAX:** Pronotal ctenidium with about nine spines on each side, preceded by a row of fine bristles, and with fine hairs intercalated between the bristles. Notum of mesothorax with three rows of bristles: The first very incomplete, the second of five bristles, the third of four longer bristles; the last two with intercalated small hairs. Mesonotum with five or six bristle-like extensions near caudal margin, suggesting thin elongate spinelets. Mesepisternum (MPS.) in male with an irregular horizontal median row of four bristles, in female the bristles irregular in position. Mesepimeron (MPM.) of male with six bristles in two rows of three, the ventral two of the caudal row immediately dorsad and ventrad (though laterad) to the spiracle; the female with about nine bristles in three irregular rows of three. Metanotum with three rows of bristles, the caudal bristles four or more times the length of the others. Lateral metanotal area (supraepisternum of authors) subquadrate, with two large bristles. Metepisternum with one bristle and that near dorsocaudal angle. Metepimeron with seven bristles arranged 3-3-1, the most ventral in the second row and the most caudal bristle being about twice the size of the others.

**LEGS:** Mesocoxae and metacoxae with a submedian lateral longitudinal sclerotization and a mesial somewhat trident-shaped longitudinal sclerotization, the middle branch of the trident proximally joining the lateral sclerotization. Femora with one mesial bristle and no lateral bristles. Most of the dorsolateral bristles of tibiae paired. With a pair of unequal long bristles at lateroventral angle of tibiae; immediately proximad a pair of very much smaller bristles. Actual measurements of male tibiae

Leg	Tibia	Tarsal segment				
		1	2	3	4	5
I. ....	247	100	105	87	62	148
II. ....	408	207	165	122	89	148
III. ....	610	412	287	172	99	155

and segments of tarsi (petiolate base deleted) shown in micra. Petiolate bases of second and third protarsal and midtarsal segments long, more than one-third length of segment. None of tarsal bristles reaching beyond apex

of following segment; most of the bristles not even extending three-fourths of length of following segment. Blade of unguis slightly more than twice length of thickened recurved basal portion.

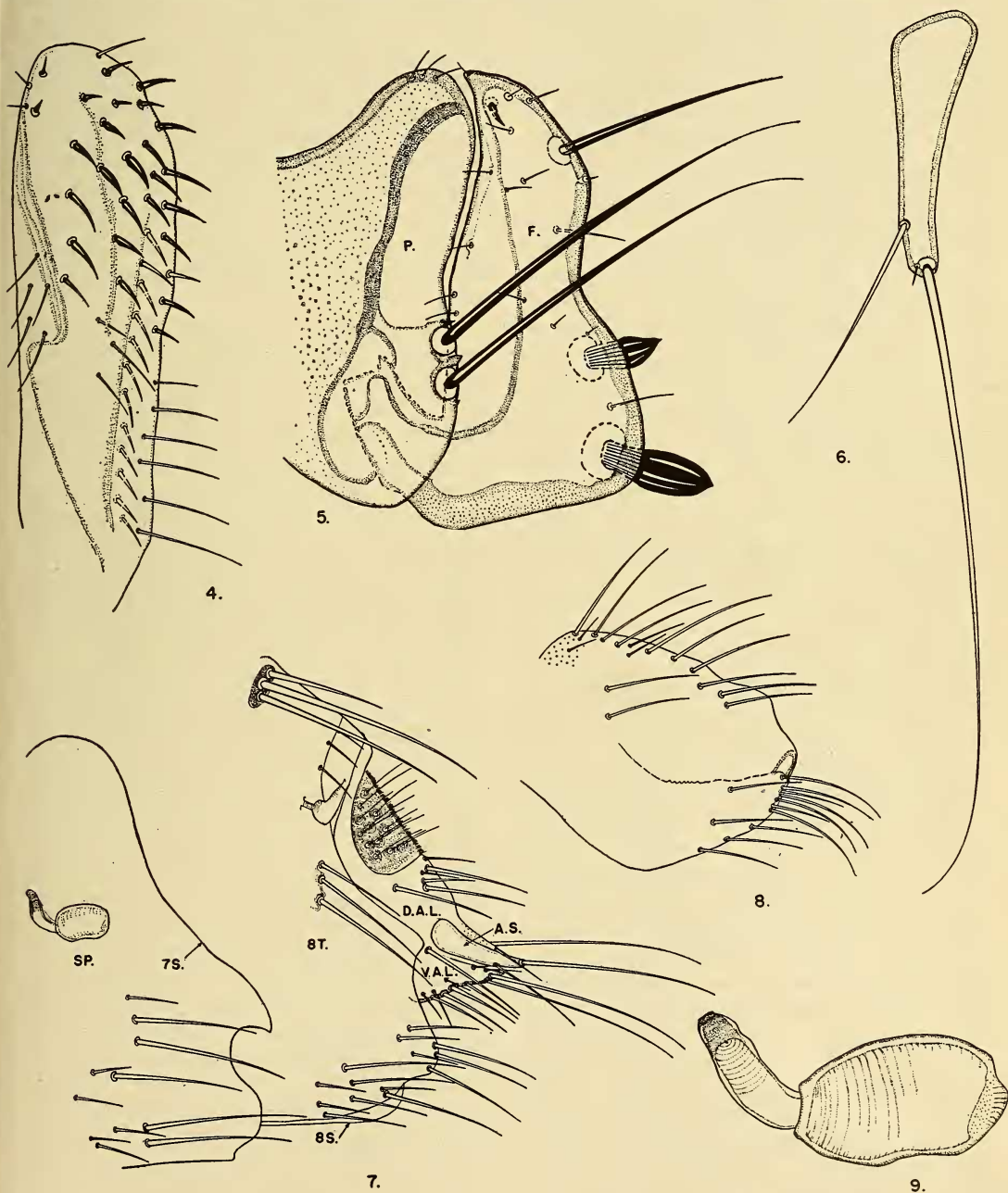
**ABDOMEN:** Abdominal terga on each side typically with two or three short bristles in cephalic row and six long bristles in caudal row, the ventralmost bristle inserted just ventrocaudad of spiracle. In male, first tergum with two apical teeth of spinelets per side, second and third with one each; female with tergal teeth 1(2)-2-1(2)-1. Both sexes with one bristle on basal sternum and with sterna III-VI with a row of three ventral bristles. Male with three antepygidial bristles (Fig. 2, A, B.), but dorsal bristle almost vestigial, reduced to less than one-tenth length of middle bristle; ventral bristle somewhat less than half as long as middle bristle. Female with dorsal bristle somewhat more than one-half length of middle bristle, and with ventral bristle more than four-fifths length of middle one.

*Modified abdominal segments.*—**MALE** (Fig. 2): Seventh sternum truncate; with two basal bristles. Eighth sternum (8S.) reduced; basal portion with sinuate cephalic margin and a dorsad-projecting narrow lobe, dorsal margin concave; produced caudally into a narrow projection with parallel sides and with an expanded bifid apex. The X-gland (X.G.) of Wagner conspicuous near base of eighth sternum. Eighth tergum (Fig. 2, 8T., *partim*, and Fig. 8) very large, covering most of body extending caudad of pygidium; with dorsocephalic angle spiculose; dorsal margin sinuate and bearing about nine very long marginal or submarginal and two median bristles; caudal margin with a shallow sinus. Ventral third of eighth tergum more sclerotized than rest. The margin of the sclerotization curving dorsad near caudal margin and forming a prominent mesial conelike structure; ventral sclerotized portion with 9 to 13 long bristles, of which all but two or three are marginal, four or five are very long and curved ventrad, and two or three of the marginal are mesial in insertion. Ventral margin of eighth tergum concave.

**Immovable process of clasper** (Fig. 2, P., and Fig. 5), broad and conical, with three small apical bristles; caudal margin arching caudad in vicinity of the two long acetabular bristles, and with very small projections above, be-

tween, and below acetabular bristles. Movable finger (F.) large; with cephalic margin slightly concave and sinuate; caudal margin strongly sinuate, forming a dorsal and ventral lobe, dorsal lobe narrowing at subconical apex of finger; ventral margin straight. Finger with a mesial,

relatively small spiniform near apex; with a mesially inserted long bristle near middle of caudal margin of dorsal lobe; and with two large mesial spiniforms near caudal margin of ventral lobe, the spiniforms extending distad for half or more of their lengths; with four



FIGS. 4-9.—*Opisodasys hollandi*, n. sp.: 4, Distal arm of male ninth sternum; 5, clasper lobe and movable finger; 6, anal stylet, female; 7, modified abdominal segments, female; 8, eighth tergum, male; 9, spermatheca. (See p. 139 for list of abbreviations.)



small bristles on cephalic margin; one small bristle at apex; four or five bristles near caudal margin, some mesial in insertion, and four or five small median bristles. Manubrium (MB.) wide, about three times as long as wide near base, and about one-third width of tergal apodeme of ninth tergum (T.AP.9), which forms apparent dorsoproximal portion of clasper lobe. Ninth tergum apparently reduced to a rectangular area between its apodeme and clasper lobe. Subpygidial sclerite of Wagner (S.S.) conspicuous, median, shaped like a discoid seen on end, lying parallel to longitudinal axis of body. Ninth sternum large, U-shaped, its proximal arm (vertical, anterior or interior arm of authors) (P.A.) well sclerotized, digitoid in shape. Trough of U-shaped ninth sternum somewhat wider than proximal arm, and bearing a long apodemal rod (A.R.9). Distal arm of ninth sternum (horizontal, posterior or exterior arm of authors) (D.A. and Fig. 4) slightly clavate; with a sinus at proximal fifth, forming a small proximal lobe with four or five small marginal bristles, and a conspicuous apical club armed with four irregular rows of lateral spiniforms, a row of mesial spiniforms, and scattered bristles, most marginal. Intersegmental membrane (I.M.) between eighth and ninth segments arising as a somewhat sclerotized mesial projection paralleling dorsal margin of eighth sternum, curving dorsad towards trough of the U-shaped ninth sternum, and then extending caudad as a filamentous delicate process bearing a series of threadlike tufts.

Aedeagal apodeme (AE.A., Figs. 2 and 3) elongate, with sides subparallel and with cephalic (proximal) end shortly acuminate and slightly upcurved. Base of aedeagus proper curving ventrad, concave, paralleling curve of dorsal margin of trough of ninth sternum. Aedeagus (AED. Fig. 3) much shorter than its apodeme. Lateral lobes of aedeagus (L.L.) semicircular ventrad of proximal ventral margin of base of aedeagus, then gently curved dorso-caudad, covering base of crochets and half of the acuminate, curved median dorsal lobe (M.D.L.). Armature of sheath of inner tube of aedeagus (A.I.T.) paired and bifid; with a proximal rodlike sclerotization and a distal, longer, curved, hooklike structure. The latter associated with a thin curved elliptical band which loops ventrad and apically terminates in a pair of small sicklelike blades.

Aedeagal crochets (CR.) very large, extending most of length of end-chamber; subquadrate except for an elongate ventrad-directed rodlike arm; proximoventral margin convex; dorsal margin straight and heavily sclerotized; dorso-distal margin biconcave; the conspicuous boomerang-shaped part of crochets constituting the so-called parameres of authors; the caudal portion of the boomerang somewhat beakshaped. Ventral intramural rod of endophallus (I.R.) well developed. Penis rods (P.R.) not coiled, extending only slightly cephalad of aedeagal apodeme. Apodemal strut consisting of a proximal heavily sclerotized, subcordate lobe and a distal large rhomboidal lobe, associated with armature of sheath of inner tube; with smaller ovoid sclerotizations between the two.

Tenth abdominal segment conspicuous; with pygidium convex; the dorsal margin of dorsal lobe of proctiger (D.A.L.) (tenth tergum of authors) well sclerotized, although apex is relatively feeble and with small bristles. Ventral lobe of the proctiger (V.A.L.) very well developed, subrectangular, longer than the movable finger of clasper, and with submedian small bristles and a dorsal and apical row of long bristles. Proximal ventral sclerite of tenth segment (P.V.S.) (subanal sclerite of Wagner) prominent and bearing a mesial, dark sinuate sclerotization near ventrocaudal angle.

FEMALE: Seventh sternum (Fig. 7, 7S.) with dorsocaudal margin slightly sinuate and with caudal margin shaped like an S, with a somewhat acuminate lobe formed by the roof of the S and the junction of the dorsocaudal margin; with an irregular row of large bristles. Eighth tergum (8T.) with three small bristles near spiracle; a median group of two or three large bristles, arising from a somewhat sclerotized area; ventral and ventrocaudal region with 14 bristles arranged in five irregular rows of 3, 3, 2, 3, and 3, the last three marginal. Eighth sternum (8S.) narrow, without bristles, dorsal anal lobe of proctiger (D.A.L.) with about seven bristles caudad of pygidium and a very long marginal bristle and a short marginal bristle near middle of anal stylet; with one or two long bristles ventrad of insertion of anal stylet; spiculose dorsad of stylet. Anal stylet (Fig. 7, A.S., and Fig. 6) somewhat more than three times as long as wide at base; dorsal margin concave, especially proximally, ventral

margin subparallel to dorsal; with a long ventral bristle at distal four-fifths and a very long apical bristle; at times with a supernumerary tiny ventral subapical bristle. Ventral anal lobe (V.A.L.) (tenth sternum or substylar flap of authors) well sclerotized; with caudal margin sinuate; with four stout marginal bristles at proximal portion and two very long apical bristles; with four or five small submarginal bristles near some of the larger ones. Spermatheca (Fig. 7, SP., and Fig. 8) with head roughly oblong; not quite twice as long as wide at maxima; dorsal margin slightly convex, ventral margin fairly straight but with a definite shallow sinus; margin well sclerotized. Tail of spermatheca about two-thirds as long as head and about one-third as wide; annulations apparent near apical portion; apex very densely sclerotized.

*Type locality*.—Mexico, state of Michoacán, vicinity of municipality of Tancitaro, elevation 6,000–8,000 feet.

*Type host*.—*Sciurus poliopus cervicalis* Allen, 1890, a tree squirrel.

*Types*.—Holotype male; 7,800 feet elevation, July 15, 1941. Allotype female; same, July 1, 1941.

*Paratypes*.—Three males and 8 females; same. Four females from same host, Michoacán, Tancitaro, Mount San Miguel, elevation 6,500 feet, July 17, 1941, all collected by R. Traub.

*Distribution of types*.—Holotype and allotype deposited in entomological collections of Chicago Natural History Museum. Paratypes distributed among collections of U. S. National Museum, the Rocky Mountain Laboratory of the U. S. Public Health Service (Hamilton, Mont.), the British Museum; the Dominion Entomological Laboratory (Kamloops, British Columbia), and that of the author and various other siphonapterologists.

The species is named in honor of G. P. Holland, of the Dominion Entomological Laboratory, Kamloops, British Columbia, in partial recognition of his many contributions to the study of Siphonaptera.

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## ABBREVIATIONS USED IN FIGURES

- A.B. Antepygidial bristles.  
 A.E.A. Aedeagal apodeme.  
 AED. Aedeagus.  
 A.I.T. Armature of sheath of inner tube of aedeagus.  
 AR.9 Apodemal rod of ninth sternum.  
 A.S. Anal stylet.  
 CR. Crochets of aedeagus.  
 D.A. Distal arm of ninth sternum.  
 D.A.L. Dorsal anal lobe.  
 EPX. Epipharyngeal stylet.  
 F. Movable finger of clasper.  
 I.M. Intersegmental membrane.  
 I.R. Ventral intramural rod of endophallus.  
 LAC. Laciniae or maxillary stylets.  
 L.L. Lateral lobes of aedeagus.  
 L.P. Labial palpi.  
 MB. Manubrium.  
 M.D.L. Median dorsal lobe.  
 M.P. Maxillary palpi.  
 MPM. Mesepimeron.  
 MPS. Mesepisternum.  
 MX. Maxillary lobe.  
 P. Immovable process of clasper.  
 P.R. Penis rods.  
 P.V.S. Proximal ventral sclerite of tenth segment.  
 SP. Spermatheca.  
 S.S. Subpygidial sclerite of Wagner.  
 T.AP.9 Tergal apodeme of ninth segment.  
 V.A.L. Ventral anal lobe.  
 X.G. "X-gland" of Wagner.  
 7S. Seventh sternum.  
 8S. Eighth sternum.  
 8T. Eighth tergum.